WHAT IS CLAIMED IS:

CLAIM 1. In an ad-hoc, peer-to-peer radio system comprising a series of terminals where each said terminal is capable of making at least one of an outgoing call or receiving an incoming call, each said terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means and memory means for storing program software means therein, the improvement comprising:

said memory means comprising software means for creating connectivity messaging and data transfer plan messaging information for transmission to other said terminals, and for receiving similar said information from other said terminals from which said terminal can receive; said software means comprising means for delivering said connectivity and data transfer plan information messaging to a configuration channel for transmission to said other terminals belonging to the same service group (SG);

said connectivity messaging comprising a utilization map, the power used for transmitting the messaging, and the level of the environmental noise at the transmission site of the transmitting terminal;

said data transfer plan information messaging comprising messaging for use in changing the transmit power level and for determining routing paths; and

said utilization map comprising information messaging on the availability of time slots of a previous time frame based on whether time slots were used in said previous time frame or were unavailable for use due to high-level noise.

CLAIM 2. The ad-hoc, peer-to-peer radio system according to claim 1, wherein said software means further comprising means for generating at least one optimal connection path of a call based on said messaging received from other said terminals in said service group (SG), whereby said call is routed to its destination by routing said call along a route utilizing at least one of some of said terminals of said series of terminals based on least-energy routing, so that the least amount of energy over a selected route is chosen for completing a call.

CLAIM 3. The ad-hoc, peer-to-peer radio system according to claim 2, wherein said means for generating at least one optimal connection path of a call based on said messaging received from other said terminals in said service group comprises determining the smallest path loss relative to said other terminals from which it has received similar messaging; said means for generating at least one optimal connection path of a call causing the said software means to initiate a request-to-register message in said connectivity messaging, whereby said terminal will register with the closest of said other terminals for serving as at least a first node of said optimal path.

CLAIM 4. The ad-hoc, peer-to-peer radio system according to claim 3, wherein said connectivity messaging comprises means for generating information on the class of service (COS) being transmitted, said means for generating information on the type of message being sent comprising the capability of reporting at least one of the following types of COS information: voice type information, data type information, and video type information, whereby routing of a call is based also on the said type of COS information being transmitted; said means for generating at least one optimal connection path of a call based on said messaging received from other said terminals conditioning said optimal connection based on said type of COS, whereby for data

transmission least energy routing of a call will be determinative, and whereby for voice calls delay of the connection path will be determinative.

CLAIM 5. In an ad-hoc, peer-to-peer radio system comprising a series of terminals where each said terminal is capable of making at least one of an outgoing call or receiving an incoming call, each said terminal comprising computer means, and memory means for storing program software means therein, the improvement comprising:

each said terminal of said series of terminals comprising a modem means for transmitting first communications information on at least one data channel (DC) at a first chosen power level, and for transmitting second communications information on a control channel (CC) at a second chosen power level;

said first power level being one of equal to or less than said second power level, whereby RF interference among said series of terminals is minimized.

CLAIM 6. The ad-hoc, peer-to-peer radio system according to claim 5, wherein said software means of each said terminal comprises means for generating communications-information based on time division messaging.

CLAIM 7. The ad-hoc, peer-to-peer radio system according to claim 6, wherein said communications-information comprises a series of time frames (TM) each divided into a series of time slots (TS); said communications-information comprising at least one time slot in which said control-channel messaging data is transmitted via said modem means, and at least two time slots in which is transmitted channel data (CD) messaging data via said modem means.

CLAIM 8. The ad-hoc, peer-to-peer radio system according to claim 7, wherein said software means of each said terminal for generating said communications-information based also generates said communications-information based on frequency division multiple access (FDMA), said software means for generating said communications-information transmitting said control-channel (CC) information at a first frequency, and said data-channel (DC) information at at least one other frequency different from said first frequency.

CLAIM 9. The ad-hoc, peer-to-peer radio system according to claim 8, wherein each said time frame comprises a first said time slot (TS) in which said control-channel (CC) information is transmitted at said second power level, and at least three other time slots (TS) in which said data-channel(DC) information is transmitted at said first power level;

said first time slot transmitting said control-channel information at said first frequency of F0, and said at least three subsequent time slots (TS) transmitting said data-channel (DC) information at frequencies of F1, F2, and F3, respectively.

CLAIM 10. A protocol for use in an ad-hoc, peer-to-peer radio system comprising a series of terminals where each said terminal is capable of making at least one of an outgoing call or receiving an incoming call, and where each said terminal comprising computer means, memory means for storing program software means therein, and where each said terminal is capable of being hop of a routing path connecting a call from a source to a destination, comprising:

software means for said memory means of each said terminal, said software means comprising means for generating communications-information for transmission based on time-division messaging;

said communications-information comprising a series of time frames (TM) each divided into a series of time slots (TS); said communications-information comprising at least one time slot in which control-channel (CC) messaging information is transmitted, and other time slots in which is transmitted channel data (CD) messaging information;

said at least one time slot transmitting said control-channel information at a first frequency of F0, and said other time slots (TS) transmitting said data-channel (DC) information at frequencies of F1, F2, and F3, respectively;

each said time frame (TF) comprising an inter-frame time gap (IFTG) at the end of each said time frame (TF) in which no communications-information is transmitted, whereby each said terminal is allowed time to perform necessary calculations.

CLAIM 11. In a radio terminal for use in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, said radio terminal capable of making at least one of an outgoing call or receiving an incoming call, and comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means and memory means for storing program software means therein, the improvement comprising:

said memory means comprising software means for setting the power level of a transmission of control-channel messaging to be transmitted by said transceiver means;

said software means further comprising means for generating routing messaging including said power level set by said means for setting for use in determining the connection path of a call;

said software means further comprising means for determining the optimal connection path of an outgoing call based on least energy use, so that the least amount of energy over a selected route is chosen for completing the call.

CLAIM 12. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 11, wherein said software means comprises message-generating means for generating a routing table based on said least energy use, said routing table comprising time-frame based messaging.

CLAIM 13. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 12, wherein time-frame based messaging is based on time division.

CLAIM 14. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 12, wherein said message-generating means for generating a routing table further comprises means for generating information on the class of service (COS) being transmitted, said means for generating information on the type of message being sent comprising the capability of reporting at least one of the following types of COS information: voice type information, data type information, and video type information, whereby routing of a call is based also on the said type of COS information being transmitted.

CLAIM 15. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 12, wherein time-frame based messaging comprises a series of time frames (TM) each divided into a series of time slots (TS), one said time slot being used for transmitting said control-channel (CC) messaging including said power level, said routing messaging, and said optimal path connection of an outgoing call based on least energy use.

CLAIM 16. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 15, wherein other time slots of said series of time-slots based are used for transmitting channel data (CD) messaging information.

CLAIM 17. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 16, wherein said one time slot transmits said control-channel information at a first frequency of F0, and said at other time slots (TS) transmit said data-channel (DC) information at frequencies different from said first frequency and different from each other.

CLAIM 18. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 16, wherein each said time frame (TF) further comprises an inter-frame time gap (IFTG) at the end of each said time frame (TF) in which no communications-information is transmitted, in order to allow time to perform necessary calculations.

CLAIM 19. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 18, wherein each said time frame (TF) further comprises a last time slot (LTS) at said first frequency in which is contained initial control communications-information indicating initial presence of said radio terminal in order to start communicating with other said terminals.

CLAIM 20. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 19, wherein said software means further comprises means for switching transmission of initial control communications-information from said last time slot (TS) to another, free, earlier time slot of a subsequent time frame (TF) in order to reduce the chance of collision with other said terminals also initially registering.

CLAIM 21. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 16, wherein said first time slot (TS) for said control-channel (CC) information is transmitted at a first power level, and said other time slots (TS) for said data-channel(DC) information are transmitted at a second power level.

CLAIM 22. The radio terminal for use in an ad-hoc, peer-to-peer radio system according to claim 21, wherein said second power level is equal to or less than said first power level, whereby RF interference is reduced.

CLAIM 23. A method of routing a call in an ad-hoc, peer-to-peer radio system, which radio system comprising a series of radio terminals each capable of making at least one of an outgoing call or receiving an incoming call, and where each said terminal is capable of being a node to a call made from a source-terminal, said method comprising:

(a) transmitting one of voice or data over a routing path of said terminals;

(b) determining the class of service (COS) of the call;

(c) said step (b) comprising determining which of said voice or data is being transmitted by the call;

(d) selecting a routing path based on said step (b);

(e) said step (c) comprising basing its decision of a routing path based on latency and bitter error rate of a routing path.

CLAIM 24. A method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising

transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means and memory means for storing program software means therein, comprising:

(a) creating a service group (SG) of said radio terminals where each said radio terminal of said service group may be connected to any other of said radio terminals of said service group via at least one connecting path;

(b) creating in each said radio terminal of said service group (SG) via said software means connectivity messaging and data transfer plan messaging information for transmission to other said radio terminals of said service group, and for receiving similar said information from said other radio terminals;

(c) delivering said connectivity and data transfer plan information messaging to a configuration channel for transmission to said other radio terminals belonging to the same service group (SG);

(d) said step (b) comprising developing by said software means a utilization map, the power used for transmitting the messaging, and the level of the environmental noise at the transmission site of the transmitting terminal;

(e) said step (b) further comprising using said data transfer plan information messaging for use in adjusting the transmit power level and for determining at least one routing path.

CLAIM 25. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 24, wherein said step (d) comprises:

(f) developing said utilization map with information messaging based on time division on the availability of time slots of a previous time frame based on whether time slots were used in said previous time frame or were unavailable for use.

CLAIM 26. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 24, further comprising:

(f) transmitting said connectivity and data transfer plan information messaging to other said radio terminals of said service group of radio terminals via said configuration channel;

(g) receiving said connectivity and data transfer plan information messaging at said other radio terminals;

(h) determining the optimal routing path of a call to or from a said radio terminal based on said received connectivity and data transfer plan information.

CLAIM 27. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 26, wherein:

said step (h) comprises determining the class of service (COS) of a call to be transmitted from a respective said transmitting radio terminal, and selecting said optimal path based on said class of service.

CLAIM 28. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 27, wherein said step of determining the class of service comprises selecting from one of the following: voice transmission, and data transmission.

CLAIM 29. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 27, wherein said step of determining the class of service comprises selecting from one of the following: voice transmission, data transmission, and video transmission.

CLAIM 30. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 27, wherein said step of selecting said optimal path based on said class of service comprises basing the decision on bit error rate (BER) or latency.

CLAIM 31. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 27, wherein said step of selecting said optimal path based on said class of service comprises basing the decision on bit error rate (BER) for data transmission, and on latency for voice transmission.

CLAIM 32. The method of selecting an optimal routing path of a call in an ad-hoc, peer-to-peer radio system according to claim 31, wherein said step of selecting said optimal path based on said BER comprises determining the smallest path loss relative to said other terminals from which it has received similar messaging; said step (h) comprising initiating a request-to-register message in said connectivity messaging to register with the closest available other said radio terminal for serving as at least a first node of said optimal path.

CLAIM 33. A method of reducing radio interference in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals forming a service group, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means and memory means for storing program software means therein, where a call for sending packet data from one radio terminal may be connected utilizing at least one other said radio terminal as a node in the routing connection of the call to a destination other said other radio terminal, comprising:

(a) transmitting connectivity messaging from said one radio terminal to at least one other radio terminal of said service group;

(b) said step (a) comprising transmitting said connectivity messaging using time division signaling having a series of time frames (TF) with each said time frame consisting of a plurality of time slots (TS);

(c) said step (b) comprising dedicating one of said time slots (TS) of each said time frame (TF) as a configuration channel in which said connectivity messaging is transmitted;

(d) said step (b) comprising dedicating other of said time slots (TS) of each said time frame (TF) as data channels in which data information messaging is transmitted;

(e) said step (b) comprising transmitting said connectivity messaging of said configuration channel of at a power level equal to or greater than the power level at which said data information on said data channels is transmitted.

CLAIM 34. A method of transmitting radio calls in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals forming a service group, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like

terminals of said series of terminals, computer means and memory means for storing program software means therein, comprising:

(a) establishing a call from a said radio terminal based on time-division access;

(b) said step (a) comprising creating messaging consisting of a series of time frames (TF) with each said time frame consisting of a plurality of time slots (TS);

(c) said step (b) comprising dedicating one said time slot for use as a configuration channel for transmitting information useful in establishing a routing path of a call;

(d) said step (b) further comprising dedicating other of said time slots for use as a data channels for transmitting the actual call information based on the class of service(COS) of the call;

(e) step step (b) further comprising forming an inter-frame time gap (IFTG) between said time frames (TF) during which each radio terminal may process said data received from another terminal.

CLAIM 35. In a method of transmitting radio calls in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means and memory means for storing program software means therein, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel , comprising:

(a) said radio terminal monitoring said control channel for information about the power level at which other said terminals are transmitting over said control channel; and

(b) adjusting the power level of said terminal based on the information received on said control channel in said step (a).

CLAIM 36. The method of transmitting radio calls in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals according to claim 35, wherein before said step (a):

(c) said terminal transmitting a registration request signal over said control channel for registering with at least one of at least one other said radio terminal and a gateway;

(d) said step (a) monitoring the evolution of path loss to all radio terminals receiving said registration request of said step (c);

(e) said step (b) comprising adjusting said power level in accordance with path-loss variation and noise level from said step (d).

CLAIM 37. The method of transmitting radio calls in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals according to claim 36, further comprising:

(f) said step (c) comprising registering initially with one other said radio terminal for forming a node by which a call to and from said radio terminal may be completed;

(g) said one other radio terminal submitting said registration request signal from said radio terminal to at least one of another said radio terminal or a gateway;

(h) said one other radio terminal monitoring said control channel for information about the power level at which other said terminals are transmitting over said control channel; and

(i) adjusting the power level of said one other radio terminal based on the information received on said control channel in said step (a);

(j) said step (h) monitoring the evolution of path loss to all radio terminals receiving the registration request; and

(k) said step (i) comprising adjusting said power level in accordance with path-loss variation and noise level from said step (j).

CLAIM 38. The method of transmitting radio calls in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals according to claim 37, further comprising:

(l) said step (g) comprising submitting the registration request directly to a gateway;

(m) recording in said gateway said registration request from said radio terminal;

(n) said step (m) comprising storing information about the connection path, consisting of at least one node, from said radio terminal to said gateway.

CLAIM 39. The method of transmitting radio calls in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals according to claim 36, further comprising:

(f) said radio terminal registering with at least one other said radio terminal, said at least one other radio terminal serving as a node of a connection routing path of a call for said radio terminal.

CLAIM 40. The method of transmitting radio calls in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals according to claim 39, wherein said step (f) comprises:

(g) registering with a plurality of other said radio terminals for forming a multi-node connection routing path;

(h) each said other radio terminal forming a said node of said connection routing path storing information in said memory means thereof about said registration

(i) each said radio-terminal storing registration information in said memory means thereof about any other said radio terminal serving as a node therefor through which it has been registered; and

(j) each said radio-terminal also storing registration information in said memory means thereof about any other said radio terminal for which it serves as a node therefor through which said any other radio terminal has been registered.

CLAIM 41. In an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means and memory means for storing program software means therein, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel, the improvement comprising:

said memory means of each said radio terminal storing registration information about any other said radio terminal serving as a node therefor through which it has been registered for forming a call-connection routing path; and

said memory means of each said radio-terminal also storing registration information about any other said radio terminal for which it serves as a node therefor through which said any other radio terminal has been registered.

CLAIM 42. In a protocol for use in a network of terminals each having computer means, memory means for storing program, and software means therein, said software means of each said terminal comprising means for generating communications-information for transmission based on time division messaging, said communications-information comprising a series of time frames (TM) each divided into a series of time slots (TS); said communications-information comprising at least one time slot in which control-channel (CC) messaging information is transmitted, and other time slots in which is transmitted channel data (CD) messaging information, the improvement comprising:

said at least one time slot transmitting said control-channel information at a first frequency of F0, and said other time slots (TS) transmitting said data-channel (DC) information at different respective frequencies;

each said time frame (TF) comprising an inter-frame time gap (IFTG) at the end of each said time frame (TF) in which no communications-information is transmitted, whereby each said terminal is allowed time to perform necessary calculations.

CLAIM 43. A protocol for use in an ad-hoc, peer-to-peer radio system comprising a series of terminals where each said terminal is capable of making at least one of an outgoing call or receiving an incoming call, and where each said terminal comprising computer means, memory means for storing program software means therein, and where each said terminal is capable of being hop of a routing path connecting a call from a source to a destination, comprising:

software means for said memory means of each said terminal, said software means comprising means for generating communications-information for transmission based on time-division messaging;

said communications-information comprising a series of time frames (TM) each divided into a series of time slots (TS); said communications-information comprising at least one time slot in which control-channel (CC) messaging information is transmitted, and other time slots in which is transmitted channel data (CD) messaging information;

each said time frame (TF) comprising a last time slot;

said software means further comprising means for generating initial control communications-information in a respective said last time slot (LTS) of a respective said time frame (TF) indicating initial presence of a respective said terminal in order to start communicating with other said terminals.

CLAIM 44. In a protocol for use in a network of terminals each having computer means, memory means for storing program, and software means therein, said software means of each said terminal comprising means for generating communications-information for transmission based on time division messaging, said communications-information comprising a series of time frames (TM) each divided into a series of time slots (TS); said communications-information comprising at least one time slot in which control-channel (CC) messaging information is transmitted, and other time slots in which is transmitted channel data (CD) messaging information, the improvement comprising:

each said time frame (TF) comprising a last time slot;

said software means further comprising means for generating initial control communications-information in a respective said last time slot (LTS) of a respective said time frame (TF) indicating initial presence of a respective said terminal in order to start communicating with other said terminals.

CLAIM 45. A radio terminal for an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means, memory means for storing program software means therein, and software means, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel, the improvement comprising:

said software means comprising means for generating communications-information for transmission based on time-division messaging;

said communications-information comprising a series of time frames (TM) each divided into a series of time slots (TS); said communications-information comprising at least one time slot in which control-channel (CC) messaging information is transmitted, and other time slots in which is transmitted channel data (CD) messaging information;

said software means further comprising sending means for sending out message-signaling toward other said radio terminals for finding and registering with at least one other of said other radio terminals;

said sending means comprising transmitting status messaging over said control channel;

said software means also comprising listening means for listening to a response to said status messaging from at least another said radio terminal on said control channel;

said software means further comprising random means for randomly selecting at least another said time slot of at least one subsequent said time frame for said sending means to transmit said status messaging when said listening means receives no response;

said software means comprising power-incrementing means for increasing the power of transmission of said status messaging over a subsequent, selected, respective said time slot as compared with a previous said time slot in which said status messaging was transmitted.

CLAIM 46. In a radio terminal for an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means, memory means for storing program software means therein, and software means, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel, the method comprising:

(a) generating communications-information for transmission based on time-division messaging;

(b) said step (a) comprising generating a series of time frames (TM) each divided into a series of time slots (TS);

(c) said step (b) comprising dedicating at least one time slot for control-channel (CC) messaging information is transmitted, and other time slots in which is transmitted channel data (CD) messaging information;

(d) sending out message-signaling toward other said radio terminals for finding and registering with at least other radio terminal;

(e) said step (d) comprising transmitting status messaging over the control channel;

(f) listening to a response to said status messaging from at least another radio terminal on the control channel;

(g) randomly selecting at least another time slot of at least one subsequent time frame for retransmitting the status messaging when said step (f) did not hear a response from another terminal;

(h) incrementally increasing the power of transmission of the status messaging over a subsequent, selected, respective time slot as compared with a previous time slot in which said

status messaging was transmitted, and repeating said step (e) using the new time slot in the new time frame.

CLAIM 47. In an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means, and memory means for storing program software means therein, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel, the method comprising:

(a) generating communications-information for transmission based on time-division messaging;

(b) said step (a) comprising generating a series of time frames (TM) each divided into a series of time slots (TS);

(c) said step (b) comprising dedicating at least one time slot for control-channel (CC) messaging information is transmitted, and other time slots in which is transmitted channel data (CD) messaging information;

(d) when said transceiver is idle from transmitting or receiving messaging information in said step (a), sending out maintenance message-signaling toward other said radio terminals for maintaining a link with at least one other said radio terminal;

(e) said step (d) comprising transmitting said maintenance status messaging message-signaling over the control channel.

CLAIM 48. In an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means, and memory means for

storing program software means therein, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel, the method comprising:

(a) building a link between a source terminal and a destination radio terminal or gateway;

(b) said step (b) comprising sending out link message-signaling from said source terminal toward said destination over said control channel at a first power level;

(c) after said step (b), said source terminal listening to said control channel for a response to said step (b) by any other said radio terminal;

(d) if said step (c) indicated no response, increasing said power level;

(e) if said step (c) indicated a response, said destination adjusting its power of transmission in accordance with the length of the path from said source to said destination and the type of service;

(f) sending out a dummy Clear-to-Send (CTS) from said destination at the power set in said step (e);

(g) a terminal receiving said dummy CTS of said step (f), and which was part of said link to said destination, answering said destination with a Ready-to-Link (RTL) message; and

(h) selecting the first hop of the link for which a connecting routing path is to be formed.

CLAIM 49. In an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means, and memory means for

storing program software means therein, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel, the method comprising:

(a) establishing a permanent link between a source terminal and a destination terminal or gateway;

(b) transmitting data from said source terminal to the destination;

(c) establishing a temporary link between said source terminal and said destination when the data being transmitted by said source terminal surpasses a predetermined limit for said permanent link.

CLAIM 50. A method of reducing the power loss between terminals in an ad-hoc, peer-to-peer radio system comprising a series of radio terminals, each said radio terminal comprising transceiver means for transmitting and receiving signals from other like terminals of said series of terminals, computer means, and memory means for storing program software means therein, said radio system based on time-dependent messaging having multiple parallel data channels and a control channel, the method comprising:

(a) controlling the power of transmission of each said radio terminal of a service group of said terminals; and

(b) said step (a) comprising creating a relatively stable power-level state wherein each terminal of said plurality of terminals stabilizes at a power level reflective of the relative path loss between it and other terminals of said permanent link.